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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/713,269

11/17/2003

Kousuke Suzuki

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25944

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02/24/2006

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EXAMINER

KIM, PETER B

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/713,269

Applicant(s)

SUZUKI, KOUSUKE

Examiner

Peter B. Kim

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 18, 20-27, 29-36 and 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-15, 18, 20, 23-27, 29, 32, 33, 35, 36 and 39 is/are allowed.
- 6) ☒ Claim(s) 21, 22, 30, 31 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/787,364.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Feb. 8, 2006 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21, 22, 30, 31, and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 21 and 30, the limitation that the wavelength of the illumination light is changed according to the amount of change of the installation environment at each exposure shot is unclear. Why would the installation environment change at each exposure shot? Is the apparatus installed at a new environment every time one exposure shot is completed?

The remaining claims, not specifically mentioned, are rejected for incorporating the defects from the base claim by dependency.

The rejections from the previous office action are maintained due to the issues discussed above.

Claim Rejections - 35 USC § 102

Art Unit: 2851

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 30, and 31 are rejected under 35 U.S.C. 102(a) as being anticipated by Shinonaga et al. (Shinonaga) (5,838,426).

Shinonaga discloses an exposure method using a projection exposure apparatus for illuminating a pattern on a mask (1) by an illumination light and projecting an image of the pattern onto a substrate (9) comprising a illumination optical system (27, 28, 29), a projection optical system (7), wavelength adjusting device (32), an image formation characteristic measurement system (col. 10, lines 43-60, detecting changes in focusing). A control system (ref. 15, 13, 17, 31, 32, 16, 22, 18, 14, 19, 20, 21), connected to the wavelength adjusting device and the image formation characteristics measurement system (Fig. 1), changing at least one condition of illumination condition by changing a wavelength of illumination light for illuminating the pattern on the first surface (1) (col. 6, lines 13-39), and detecting a change amount of image formation characteristics of an image projected on to the second surface (9) via the projection optical system (7) (col. 10, lines 43-60), detecting changes in focusing). Shinonaga discloses an installation environment measuring system for measuring and determining a change amount of the environment (22; 19, 21, 20), and changing a wavelength of the illumination light according to the change amount installation environment (col. 9, lines 25-55). Besides the first technique for adjusting the image formation characteristics by changing the wavelength, Shinonaga also teaches changing the image formation characteristics (change in focusing) by correcting the

Art Unit: 2851

focus position of the wafer (col. 10, lines 48-60). Shinonaga discloses in col. 4, line 57 – col. 6, line 29, the preparation operation for projecting the image of the pattern. Shinonaga also discloses the method and the apparatus wherein the change amount of the environment is the difference between the measure and reference environment (col. 10, lines 61-67), and the change amount of the image formation characteristics is caused by change in wavelength (col. 10, lines 48-60). Shinonaga also discloses the projection optical system made of plurality of glass (col. 11, lines 64-67), and providing gas supplied inside the projection optical system and the change in environment is the change of atmospheric pressure (col. 9, lines 7-62).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 22, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinonaga et al. (Shinonaga) (5,838,426).

Shinonaga discloses an exposure method using a projection exposure apparatus for illuminating a pattern on a mask (1) by an illumination light and projecting an image of the pattern onto a substrate (9) comprising a illumination optical system (27, 28, 29), a projection optical system (7), wavelength adjusting device (32), an image formation characteristic measurement system (col. 10, lines 43-60, detecting changes in focusing). A control system (ref. 15, 13, 17, 31, 32, 16, 22, 18, 14, 19, 20, 21), connected to the wavelength adjusting device and the image formation characteristics measurement system (Fig. 1), changing at least one condition

of illumination condition by changing a wavelength of illumination light for illuminating the pattern on the first surface (1) (col. 6, lines 13-39), and detecting a change amount of image formation characteristics of an image projected on to the second surface (9) via the projection optical system (7) (col. 10, lines 43-60), detecting changes in focusing). Shinonaga discloses an installation environment measuring system for measuring and determining a change amount of the environment (22, 19, 21, 20), and changing a wavelength of the illumination light according to the change amount installation environment (col. 9, lines 25-55). Besides the first technique for adjusting the image formation characteristics by changing the wavelength, Shinonaga also teaches changing the image formation characteristics (change in focusing) by correcting the focus position of the wafer (col. 10, lines 48-60). Shinonaga discloses in col. 4, line 57 – col. 6, line 29, the preparation operation for projecting the image of the pattern. Shinonaga also discloses the method and the apparatus wherein the change amount of the environment is the difference between the measure and reference environment (col. 10, lines 61-67), and the change amount of the image formation characteristics is caused by change in wavelength (col. 10, lines 48-60). Shinonaga also discloses the projection optical system made of plurality of glass (col. 11, lines 64-67), and providing gas supplied inside the projection optical system and the change in environment is the change of atmospheric pressure (col. 9, lines 7-62).

Although Shinonaga does not explicitly disclose changing a wavelength at each exposure shot or while the projection exposure apparatus is executing a predetermined preparation operation, which is an operation for changing the pattern of the mask or an operation for changing an aperture diaphragm, Shinonaga discloses changing a wavelength of the illumination light according to the change amount installation environment, and that the pressure

Art Unit: 2851

measurement is performed every time wafers to be processed are loaded. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to change wavelength when the pattern of the mask is changed because when the pattern of the mask is changed a new wafer is also loaded.

Allowable Subject Matter

Claims 1-15, 18, 20, 23-27, 29, 32, 33, 35, 36, and 39 are allowed.

None of the prior art of record teaches or discloses controlling the formation characteristics measurement to system to measure a change amount of the image formation characteristics while changing the wavelength and determining a predetermined relationship between a change amount of the installation environment of the projection optical system and the change amount of the image formation characteristics based on the measurement results for the each condition.

None of the prior art of record teaches or discloses an exposure method or apparatus with a first and second image formation characteristic adjustment where the second technique is applied when the first technique could not completely make the correction or when the change amount of the change in the environment is greater than a predetermined value.

Response to Arguments

Applicant argues that the cited references do not teach changing of the wavelength at each exposure shot. However, the references teach changing of the wavelength in response to the change in the environment. From the references, it can be inferred that when the environment has changed when going from one exposure shot to another, the wavelength would

Art Unit: 2851


be changed. The references may not teach changing of the wavelength at every exposure shot because the environment may not have changed significantly to require change in the environment.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter B. Kim whose telephone number is (571) 272-2120. The examiner can normally be reached on 8:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Peter B. Kim
Primary Examiner
Art Unit 2851

February 20, 2006